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THE ATTACK ON DISTINCTIONS

TO discover differences and contrasts between things that resemble each other and to find points of similarity between dissimilar things are two kinds of mental activity which, although they appear opposite and contrary, are often found united. To employ them by turns is no less indispensable to progress in any kind of knowledge than are the two opposite movements of a piston to the rotation of the wheel which it sets in motion.

Their relative importance, however, varies in the different fields of research, and as there are sciences, or phases of scientific development, in which the first predominates, so there are others in which the tendency prevails to distinguish or establish oppositions and contrasts among facts instead of connections or analogies.

It may be asked into which of the two classes in particular do the speculations of philosophers fall?

If the scholastic precept ''Distingue frequenter'' seems to assign in these greater importance to the determination of differences, on the other hand the usual conception of philosophy as the search for the highest generalities, the universal, the absolute, etc., would seem to justify a diametrically opposite conclusion.

And of this latter conclusion it may be thought that we have further confirmation when, instead of attending to what philosophers have told us of their doings, we proceed to examine what they have actually done or are wont to do.

As a matter of fact, the form under which results of philosophical inquiries appear to us is not that of the recognition or determination of fresh distinctions and differences, but, on the contrary, that of the criticism or rejection of distinctions commonly admitted.

Before drawing from this fact a conclusion favorable to the conception of philosophy as an activity predominantly unifying and aiming at the suppression of every distinction and opposition, it will, however, be opportune to examine the different modes by which philosophers have proceeded in their struggles against distinctions and differences. These various modes, as it seems to me, may be divided into the three following classes:

1. Those which consist in showing that there exists no precise line of demarcation between facts which are regarded as distinct, *i. e.,* in showing that the transition from one set to another is made by a series of intermediate gradations or shadings, in which the characters supposed to be distinctive are reconciled and the contrast between them disappears or becomes intangible.

2. Those which consist in showing that the properties in which the difference between the two classes of facts in question is supposed to consist, are possessed in equal degrees by both these classes, or by neither. As, for example, when the distinction between *egoism* and *altruism* is disputed by saying that even the so-called altruistic motives or aims are not effectual except in so far as those who are stimulated to action by them regard the result of the action as desirable and pleasing and regard its non-realization as a pain or want of satisfaction to themselves.

3. Those which consist in showing that the property, or properties, whose presence or absence is taken as a criterion of the distinction can be regarded, at the same time, as possessed and not possessed by any one of the objects in question according to the choice of the other objects with which we compare it. This is the case of the so-called *relative properties,* or *properties of relation.* So, for example, with numbers, the contrast between the words *preceding* and *succeeding* does not correspond to any distinction among them inasmuch as the fact that a number follows another does not prevent its preceding in its turn the one that follows itself.

Now, as to the processes of the first class, it is evident that the distinctions which they aim at destroying vanish only to reappear under another form, or even to return—like the demon, in the Gospel story, cast out of the man possessed—accompanied by other distinctions more powerful, and able to resist every further effort of dissolving analysis.

For instance, in answer to one who thought that the antithesis between "unity" and "plurality" could be destroyed by saying that from the *one* transition may be made to the *many* by successive additions, it might be observed that this is equivalent to a recognition that there are so many classes of *plurality, i. e.,* that, besides the distinction between the *one* and the *many,* there are others between the different *manys,* and that, therefore, by attempting to destroy the distinction in question he at once brings a hornet's nest about his ears, like the monkey in the fable who, being angry with his image reflected in a mirror, broke it in pieces and only succeeded in multiplying the figure which he had expected to annihilate.

Nor is it to be believed that more success attends attempts of the second class, those by means of which the value of a distinction is disputed by showing that some of the characteristics which were supposed to differentiate the two classes established by them are common to both.

A typical example on this point is offered us by the criticism of the distinction between the mere succession of two facts and what is expressed by saying that one of them has *produced,* or has been the *cause* of, the other. The result of such criticism has been to make it more apparent what are the distinctive characteristics whose possession confers, on the successions to which the names of "cause" and "effect" are applied, such superior importance in comparison with all the other classes of successions that experience presents to us.

"To say that a given fact is 'produced' by another," observe the critics of the idea of cause, "means nothing more than this: that the first has been succeeded by the second and that we have reason to believe something similar to the second will happen every time that anything happens similar to the first: and that something similar to the first has happened whenever anything happens similar to the second."

But surely this does not imply that all successions are of the same theoretical and practical importance. It is rather an acknowledgment that, among them, are some whose investigation contributes, in a particular way, to widen the field of our previsions and actions, and which, just on that account, deserve to be kept distinct from all others—whatever, on the other hand, may be the name that is adopted for this purpose.

The case of distinctions to which only greater prominence is given by every effort directed to the obliteration of the line of demarcation established by them is not the only one to be considered among those of the second class, mentioned above. Another case, no less important, is that of distinctions in regard to which such efforts, although they do not succeed in destroying, nevertheless succeed in *shifting,* the aforesaid line of demarcation, carrying it on to intersect one or other of the two classes which it at first separated.

Such shifting, however, is not followed by the complete disappearance of the original line of separation, but in most cases only by a diminution of its importance in comparison with the new one which is introduced.

If the latter absorbs and attracts to itself some of the offices of the first one, this may, nevertheless, still keep some others of them, and eventually acquire new ones which it did not possess at first. It not seldom happens that a distinction, by such successive transplantings and shiftings, gives rise to a series of subordinate distinctions or "segmentations."

The position which is finally assumed by the original line of demarcation corresponds ordinarily to a distinction of greater importance than those corresponding to the successive positions abandoned by it. Sometimes, however, the distinction in question, after having served to produce a series of others, more or less important, is finally reduced to cutting, so to speak, in the void, like a blade which has under it none of the material which it is intended to cut.

Of all the various changes that ordinarily accompany what we may call the *shifting of distinctions,* we have an example in the history of the distinction between *appearance* (phenomenon) and *reality* (essence, noumenon).

The very word "phenomenon," from its use as a technical term in Greek astronomy denoting the contrast between the "apparent" motions of the sun and the stars in the celestial sphere and their real motions in space, seems to have been very soon transferred by philosophers (Democritus) to denote, by analogy, the contrast between the properties of bodies which "appear" to our senses (colors, flavors, etc.) and their *real* structure, consisting of the respective positions and motions of the indivisible particles (atoms) of which they were supposed to be made up.

The word thus assumed the fresh office of distinguishing the properties which in later times were called the *secondary* properties of bodies from the so-called *primary* properties (such as form, resistance, weight, etc.). But even here a new shifting could not be long in taking place. Philosophers did not fail to ask themselves what reasons there were for conferring any privilege on these last properties on account of their being perceived "by means" of our touch or muscular contractions instead of "by means" of our eyes or our palate. To believe that a thing which we *feel extended* is *really extended,* observed they, is as unreasonable as to believe that a thing which we *see* red or green is "really" so, in itself, independently of our visual organs.

To find a new employment for the distinction, which thus became useless, two ways were open. It was possible, in conformity with the common use of the words, to employ it in the humble office of distinguishing the impressions of the man awake, with his senses in their normal condition, from those of one under hallucination. That would have led philosophers to a clearer recognition of the properties by which the former are distinguished from the latter (coherency, their being common to more than one person, their ability to be foreseen, etc.). Unfortunately, other prepossessions (especially sentimental ones) spurred on philosophical speculation in a diametrically opposite direction. From the admission that all properties, known or knowable, of bodies were alike "apparent," the conclusion was inevitably drawn that to ask whether bodies do really exist, would be to raise a question beyond the limits of the capacity of the human mind—a question to be classed among the insoluble "enigmas" of the universe. With this last evolution, the word "phenomenon" finally came to denote anything of which one might speak, knowing what he is talking about, and its contrary (noumenon, thing in itself) to denote nothing but our desire to have at our disposal a word that has no meaning.

It remains for us to consider the third of the three methods employed by philosophers in the criticisms of distinctions. It consists in claiming for a distinction concerning comparisons or relations between different objects a sense independent of the consideration of such comparisons and relations, and in regarding the fruitlessness of the attempts directed to such an aim as a proof of the unreality and invalidity of the distinction in question.

An example will explain better how this comes about. It is difficult to find, in the whole field of logic, a distinction which is so radical and important as that between affirmation and negation. And this is so, notwithstanding the fact that to ask oneself whether a given proposition is affirmative or negative, has as little sense as to ask oneself whether an object is larger or smaller without stating with what other object one wishes to compare it. There is, in fact, no affirmation that can not be regarded as the negation of some other affirmation, and if we disregard grammatical niceties, it is just as exact to say that every affirmation is a negation as to say that every negation is an affirmation. But shall we then have to say that there is no difference between affirming *anything* and denying *it*? The true distinction, therefore, is not between propositions of one class and propositions of another, but between *every* proposition and the *corresponding* negation, in the same way as the words "east" and "west" do not express any quality of the regions to which they are applied, but only indicate that these regions are in a given situation with regard to each other.

The illusions occasioned by the above-mentioned tendency to interpret a sentence which expresses a relation between different objects as if it must have a meaning for each of them taken separately, has some affinity with those exemplified by that class of sophisms which scholastic logic describes as taking what is said *secundum quid* as if it were said *simpliciter, i. e.,* the sophisms consisting in passing from an affirmation which is only true under certain restrictions, or in relation to given circumstances, to another in which such restrictions are lost sight of.

The only difference between the one case and the other is this, that, in our case, the conclusions arrived at can not even be false, inasmuch as the sentences which enunciate them have no meaning at all, as if one were to say, for instance, that two quantities were proportional without saying to what other two, or that a straight line was perpendicular without saying to what straight line or superficies.

Among the most characteristic and instructive cases of this class must certainly be placed those furnished by the recent discussions on the axioms of mechanics, especially on the meaning of the law of inertia.

The usual way of enunciating this law is liable to the objection that to assert that a body is moving in a straight line and with uniform motion can have no meaning, unless we determine:

1. To what body, supposed to be fixed, the successive positions of the body declared to move in a straight line are to be referred. A straight line drawn on a sheet of paper, while it is moving, does not imply a rectilinear motion of the point with which it is drawn; and, *vice versa,* given any motion of a point, the possibility is never excluded of so moving a sheet of paper in relation to it as to obtain a straight line upon the paper.

2. What is the measure that we adopt for *time;* in other words, by what standard are two successive intervals of time to be judged as equal or unequal. For instance, according as we choose for that purpose the apparent motion of the sun or that of the fixed stars, the same motion will appear uniform or not uniform; and no appeal can be made here, as in the case of two persons whose clocks do not agree, to any common criterion, since it is just on the choice of the criterion that the dispute turns, *i. e.,* the choice of the "standard" motion by which all others shall be measured. To say that the motion adopted as "standard" is uniform, without saying *with regard to what other motion* (just as, in the case of points of reference, to say that a body is stationary without saying in regard *to what other bodies*), is as unreasonable as to say that a man is a "contemporary" without saying of what other person.

Attempts have not been lacking to draw—from the admission of the dependence of the law of inertia on the choice of points of reference and of a fixed measure of time—the conclusion that such a law is only the result of a convention and does not correspond to any real fact, as if the very *possibility* of choosing points of reference and measures of time, in regard to which the law of inertia subsists, were not itself a fact: a fact of which we only take advantage in order to construct our science of mechanics, in the same way as we take advantage of the weight of lead to make a plumb-line, or of the instability of certain chemical compounds to make lucifer matches. If the world in which we live did not furnish us with this *fact*, no choice of conventions could combine to create it, or even to conceal its absence. The only difference between it and the more ordinary facts of our experience consists in its complexity, which is due to its implying the consideration, not only of the motion of a body with regard to another body, but also the comparison of one motion with another motion.

Distinctions based on properties that can at the same time be said to be possessed or not possessed by a given object, according to the other objects with which it is compared, are so far from being less important than others that they even form the principal object of scientific research, and tend ordinarily to acquire more prominence and importance in a science in proportion to the growth of that science in precision and power.

To prove this, we need only observe the prominent place that distinctions of this kind occupy in the sciences to which mathematical methods can be applied. To the example from mechanics, mentioned above, many others might be added no less instructive, from the distinction implied by the idea of "mass" to the more complex distinctions which come into play in other branches of physics and presuppose the choice of even more artificial points of reference and of many units of measure. The special feature of such distinctions is that the words which express them can only be defined indirectly, *i. e.*, by stating the meaning of a whole sentence in which they appear, as is the case, for instance, with the word "ratio" (λόγος) as used by Euclid, which he only defines by explaining the meaning of the assertion that the two quantities "have the same ratio to each other" as two others.

After having thus passed in review the various methods employed by philosophers for the criticism of distinctions, and having stated how each of them leads to a result diametrically opposite to the one at which it aimed, *i. e.*, leads to the increase rather than the decrease in the number and importance of the distinctions concerned, it will perhaps not be useless to consider some of the consequences which would result from the more deliberate and systematic applications of such methods to some of the most frequently discussed questions of contemporary philosophy.

Let us take, as an example, the controversy between determinists and their opponents.

Taking as a point of departure what has been said before about the idea of *cause,* and keeping in mind a principle that both contending parties agree in admitting, viz., that, properly speaking, there are no facts that *repeat* themselves (in spite of appearances due to our disposition to notice only differences interesting to us), but only facts which have more or less resemblance to one another, the conclusion is inevitable that when we say the *same* causes are always followed by the *same* effects, what we mean is, in substance, this: that *effects* which *resemble* one another constantly succeed *causes* which *resemble* one another.

What is called the "principle of causality," in so far as it asserts nothing but the existence of certain resemblances among facts whose antecedents resemble one another, is, therefore, no more incompatible with a certain degree of indeterminateness in the "effects" of given "causes" than, for example, the laws of biological heredity are incompatible with the occurrence of *spontaneous* individual divergences and variations among the descendants of the same progenitors.

To say that the effect of a given cause is determined, can only mean that *some* of its characteristics are determined, in other words, that a class, more or less extensive, is determined, to which it must belong. Therefore, the only difference there can be between determinists and their opponents consists in regarding as possible a greater or less divergence and dissimilarity in the effects of causes having given degrees of similarity, *i. e.,* in a different estimate of the greater or less probability, or frequency, of such divergences in the various fields of scientific research, from physics and mechanics to psychology and the social sciences.

Determinism and indeterminism thus come to appear as the two extreme terms of a series of possible intermediate alternatives in which the alleged opposite characters of the two theories figure, mixed and combined in the most varied proportions.

To the above example of the application of the first of the methods, already mentioned, I will add another of the application of the second and the third. The criticism to which the idea of *quantity* has been recently subjected in the more abstract regions of mathematics has led, among other things, to a clearer recognition of the nature of the distinction between what are called "differences of degree" or "quantity" and other differences, which, in contradistinction to them, we call "differences of quality."

The conclusions arrived at on the subject may be briefly summed up as follows: Differences in *quantity* are only a *special case* of differences in *quality*. They are distinguished from the latter above all by the fact that the qualities, on which they are grounded, allow a fixed arrangement of the objects possessing them, that is, they can serve as criteria to distinguish, between any two of them, which precedes or follows the other in a certain fixed series of which they all form parts. Thus, for example, the resistance which different threads make to breaking gives rise to quantitative differences among them, inasmuch as of any two of them it can always be determined which will be broken more easily than the other. On the other hand, their differences, for example, of color (unless these concern only different gradations of the same color), can not be described as *quantitative* differences, because they are incapable of being employed as criteria for an arrangement in which a certain place belongs to each of the threads.

But if the aforesaid condition is indispensable in order that given differences may be described as *quantitative* differences, it is nevertheless insufficient to define completely the notion of quantity. For this we require the presence of further conditions, more directly connected with that special method of comparison which is denoted by the name of *mensuration.*

In other words, it is required that on the objects possessing the qualities in question some operation may be performed whose analogy to that of the arithmetical sum is sufficient to allow a precise meaning to be given to the phrase that one of them possesses the said quality in a degree double, triple, etc., that in which another possesses it.

Here also we have another example of the fact, already observed, that the methods employed by philosophers for the criticism of distinctions often result in the discovery of some new way of determining and justifying the distinctions which they aimed at destroying.

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DISCUSSION

LOGIC AND EDUCATIONAL THEORY

IN his courteous review of "A Primer of General Method," in No. 21 of the current volume of this JOURNAL, Professor Hibben states that any attempt to discuss logical theory from the pragmatic standpoint is almost sure to reveal certain structural weaknesses